

A methodological framework for a political approach of mixed land use, tested in the urbanised region of Flanders, Belgium

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Key words: Mixed land use, multiple land use, typology

Abstract

In 2007 the Centre for Mobility and Spatial Planning of Ghent University (Belgium) developed, under the authority of the Flemish Department of Spatial Planning, a methodological framework to deal with policy questions on mixed land use. The resulting framework is interesting for policy makers or designers who want to explore the spatial concept of mixed or multiple land in (similar) densely urbanised regions.

The paper explores the abstracted typology of multiple land use developed within the research project. This typology finally consists of twelve categories and focuses on three basic dimensions of mixed land use: space, relationships and time. ‘Overlap’, ‘symbiosis’ and ‘good neighbours’ are only three examples of these categories. Parameters/characteristics used to analyse and typify a region in relation to this typology of multiple land use are scale, environmental tolerance, continuity, periodicity, relationships and accessibility. At different spatial levels the framework makes it possible to formulate policy suggestions on how the mixed land use in a specific region could develop or which dimensions of multiple land use are important, ...

Since the same parameters are also used to characterise land uses, it is also possible to assess in advance the impact on multiple land use of a specific land use project to be introduced in a region. In other words, the framework assesses which of the three dimensions of mixed land use are influenced by the new land use project. As a consequence, the framework makes it possible for policy makers to evaluate whether or not the mixed land use of a certain region will evolve in the direction wished for.

Introduction

Improving mixed or multiple land use in its particular spatial context of dense urbanisation was one of the central goals of the first Flemish (North-Belgian) regional spatial planning policy document, the ‘Spatial Structure Plan Flanders’, dating from 1997. Nevertheless, in 2006, a clear understanding of the current mix of land uses as well as the potential for a further mix of land uses was still considerably missing in Flanders. This lack of knowledge finally led to a short-term research project in 2007, under the authority

of the Flemish Department of Spatial Planning, about the diversity in forms and appearance of mixed land use in Flanders. The project was co-ordinated by the Centre for Mobility and Spatial Planning of Ghent University.

At the start of the project, the following two research challenges were defined:

- the collection of data about the current differentiation in mixed land use in Flanders and this in all its aspects such as regional differences, the distinction between existing or new issues of multiple land use, the degree in which land uses can be mixed and the actual differences in appearance of mixed land use in rural areas or urban tissue;
- the formulation of policy recommendations on mixed land use, territorially as well as related to different types of multiple land use, and this with a clear distinction between the improvement of existing mixed land use on the one hand and the allowance and promotion of new forms of mixed land use on the other hand.

During the research project, a third challenge increasingly pushed itself to the forefront. This is the development of a useful methodology to approach systematically the issue of (current and potential) mixed land use, both at the macro level – this is the regional, Flemish level – and at the micro level – this is the level of a real project.

This paper reports on three essential steps in the search for this methodology: first of all the necessity to choose a/one possible perspective for the development of the methodology; secondly, the theoretical elaboration of the methodology itself; and finally, the actual application of the methodology in the Flemish spatial context.

1. Necessity of a/one possible perspective on methodology

In 1999, the Dutch Institute for Spatial Planning and Housing (NIROV) took the initiative to found 'Habiforum' as a public-private network organisation to promote intensive cooperation between private actors, academics, research institutes and government and this in order to gather the know how about mixed land use in a creative and innovative way and to initiate the development of new knowledge about mixed and multiple land use. (Haccoû & Feddes, 2007)

This head start in time however does not at all mean that Dutch planning policy today disposes of a unambiguous conceptual framework to approach mixed land use. Weebbers (2007) illustrates that a wide range of notions and concepts successively passed the floor:

- 'densifying', 'mixing', 'piling' and 'intensifying use in time' as four possible dimensions of mixed land use at the start of Habiforum in 1999;
- 'intensifying', 'mixing and multiplicity or common use of space', 'subterranean and piled constructing' and 'using the temporal dimension' as four other dimensions;
- the apparently essential difference between 'mixed' and 'intensive' land use;
- 'intensification', 'combination' and 'transformation' as three possible 'ICT'- or, in another order of preference, 'TIC'-strategies of intervention;
- and finally the 'mingling' and 'combining' of land uses in the 'Nota Ruimte' (national spatial planning policy document) in 2005.

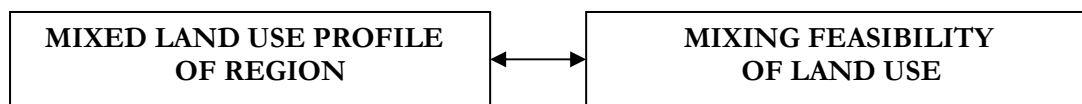
In Flanders in 2006, at the start of the research project, none of such trial and error thinking about the approach of mixed land use was available. It was in other words a completely virgin field of research. Since the short term of the research project didn't

allow a comparative study of different methodologies, this lack in knowledge resulted in the necessity to choose one of many possible perspectives for the methodological approach of mixed land use without having a really sound foundation for this choice.

Similar to the Habiforum philosophy to refreshingly combine existing know how in an innovative way, the research team was inspired in its search for a methodological approach of mixed land use by two central notions in the contemporary Flemish spatial planning approach of mobility: the ‘accessibility profile’ of a specific place and the ‘mobility profile’ of a certain land use. In this approach the main challenge exists in allocating a specific land use to a location with an accessibility profile that fits the mobility needs of the land use. In the research on mixed land use a similar distinction was made between the ‘profile of mixed land use’ of a specific place or region and the ‘mixing feasibility’ of a specific function, activity or land use.

- In this context, the profile of mixed land use of a place or region has to be interpreted as the ensemble of characteristics of the place or region concerning the mix of land uses: the existing mix of land uses as well as the potential mix of land uses.
- On the other hand, the mixing feasibility of a function, activity or land use should be described as the ensemble of characteristics of this function, activity or land use concerning its potential to be mixed with (an existing or potential mix of) functions, activities or land uses.

In this perspective the issue of mixed land use in a certain region can be brought back to the – simple – question whether the adaptation of the spatial configuration of land uses or the introduction of new land uses with a particular mixing feasibility will or will not result in a change of the existing profile of mixed land use of this region.



Whether this change of the existing profile of mixed land use of a region is wished for or not will also depend on other aspects, such as public support and political decision making. Moreover, the aim to enhance mixed land use is often part of a broader challenge. The mix of agriculture and recreational activities in certain regions can be, for instance, primarily inspired by an economic broadening of agricultural activity to improve the viability of rural regions and only secondarily by the spatial mix. Or, a spatial mix of residential and economic activities is often initiated by the challenge to reduce car traffic.

2. Theoretical elaboration of methodology

It was felt necessary to elaborate on the keywords ‘mixed land use profile’ and ‘mixing feasibility’ theoretically as well as methodologically, before applying them in concrete situations. More in particular, specific efforts were made concerning:

- a framework to match profile and feasibility; and
- a theoretical typology to grasp existing and potential multiple land use.

2.1. Match between mixed land use profile and mixing feasibility

As the assessment of the match between the mixed land use profile of a region and the mixing feasibility of a land use was essential to the research, it was necessary to find a framework to link profile and feasibility unambiguously. This is the main reason why both – the profile of mixed land use as well as the mixing feasibility – are constructed and described through six identical characteristics of multiple land use: scale, environmental tolerance, continuity, periodicity, relationships and accessibility. In relation to the profile of mixed land use or the mixing feasibility of land uses, these characteristics are translated into other specific notions that respectively refer to a territorial or a functional dimension (see table 1). ‘Scale’, for instance, is translated into ‘pixel’ (size) of a land use and ‘morphology’ of a region.

Table 1. Multiple land use characteristics for matching mixed land use profile and mixing feasibility.

Multiple land use characteristic	Mixing feasibility of a land use	Mixed land use profile of a region
Scale	Pixel	Morphology
Environmental tolerance	Impact	Level of pressure
Continuity	Ir-/reversibility	Spatial dynamics
Periodicity	Constant/periodical	Alternating spatial use
Relationships	Introvert/extravert	Mono-/multifunctional
Accessibility	In-/accessible	Penetrability

These multiple land use characteristics are the result of a continuous search throughout the research project. They arose from the implementation of the methodology at the Flemish scale (see chapter 3) and from case studies at the micro scale of a specific planning project. The simultaneity of these searches at different scales has finally resulted in a scale independency of the multiple land use characteristics – or a potential of these characteristics to be used at every scale. In other words, differences in the implementation at the macro or at the micro scale won’t concern the conceptual framework. They will rather refer to the character of the data to be collected at the different scales and to the analytical approach of multiple land use at the micro level and a more holistic approach at the macro level.

2.2. Typology of multiple land use

The research could only result in policy relevant results and a basis for political decision making if, preliminarily, a practicable typology of multiple land use was developed. This is the reason why, in the research project, multiple land use is converted into twelve types as a result of the interaction between three determining dimensions of mixed land use:

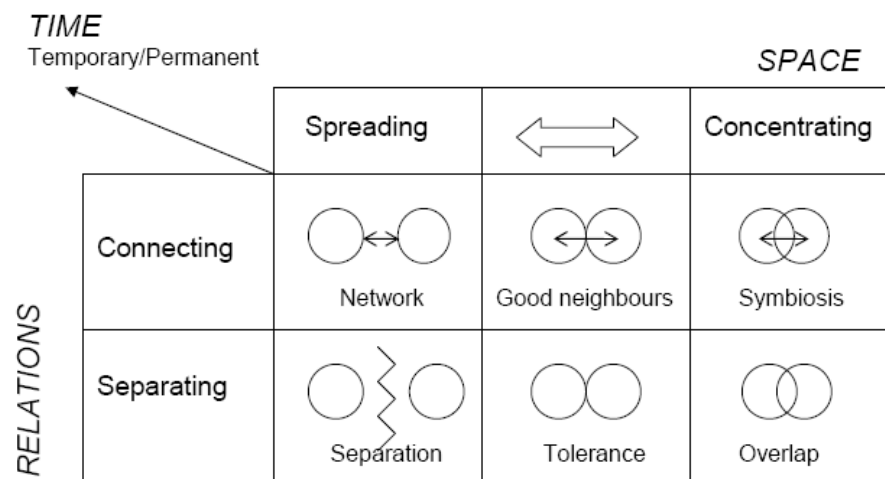
- the spatial dimension of multiple land use with ‘spreading’ and ‘concentration’ of land uses in space as two extremes;
- the relational dimension of multiple land use with the extreme options of ‘connecting’ (relations) or ‘separating’ (no relations) land uses;
- the temporal dimension of multiple land use where land uses can or can not alternate in time (permanent versus temporary use of space).

The interaction between the spatial and relational dimensions of multiple land use results in six types of multiple land use:

- a 'network' of land uses, land uses in a relationship of 'good neighbours' and a 'symbiosis' between land uses as three types of multiple land use with a clear interrelation, showing an increasing spatial concentration;
- a 'separation' between land uses, a mutual 'tolerance' of land uses and a spatial 'overlap' of land uses as three types of multiple land use with a weak or not existing interrelation, showing an increasing spatial concentration.

In combination with the possibility to use space permanently (alternating land use) or temporarily (no alternating land use), the six types mentioned above are doubled to twelve types of multiple land use (see figure 1).

Figure 1. Typology of multiple land use.



- * Today the 'network' type is probably the most common type. Land uses, functions and activities interrelate intensively, amongst others by means of information and communication technology, and don't need to be situated in each other's proximity.
- * When proximity becomes more important, the 'good neighbours' type arises. Often it involves functions and activities within a same segment of society (i.e. a huge car assembly firm with small supply companies in its immediate proximity), but also other functional combinations (a camping ground next to a nature park) are possible.
- * 'Symbiosis' exists when functions and activities are not only strongly related to each other but also use space very intensively, for instance because of the provision in common infrastructure (relational and spatial mix of numerous functions and activities in urban centres, nature development in a drinking water-collection area).
- * Talking about 'separation' implies that, fundamentally, there is no mix of land uses. Because there are no interrelations, functions and activities don't feel the need to be located in each other's proximity and/or are often consciously located at a distance of each other, sometimes accentuated by a buffer zone (between industrial zones and residential zones).
- * When functions and activities, for instance because of a lack of mutual nuisance or because of their similar large scale, can border one another but don't have any functional relationship, their type of multiple land use can be defined as 'tolerance'. Fine illustrations are the large scale, independent functions and activities along urban ring roads.
- * The mutual tolerance of functions and activities can be combined with a more intensive use of space and result in an 'overlap' – for instance through the common use of certain infrastructure – but without a strengthening of interrelations (roadshops, sports centres, offices, ... with common parking facilities).

3. Application of methodology in Flemish spatial context

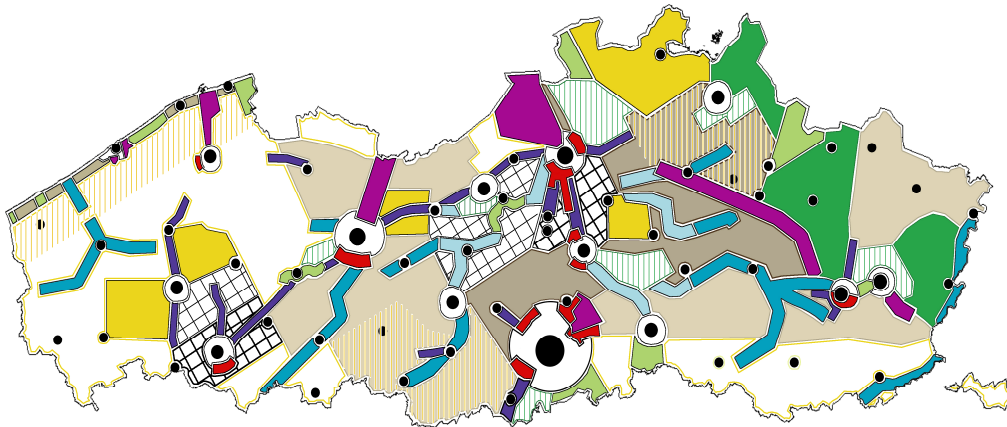
The implementation of the methodology in the Flemish spatial context in the research project resulted in three different products.

- First of all a picture of the existing mixed land use in Flanders was developed. Therefore, Flanders was divided in a number of subregion types based on their existing multiple land use pattern. For each of these subregion types, the existing and potential mixed land use profile were defined.
- At the same time the mixing feasibility of some specific land uses was defined.
- Finally, both elements – the mixed land use profiles on the one hand and the mixing feasibilities on the other hand – were confronted and led to policy suggestions for multiple land use per subregion.

3.1. A multiple land use map for Flanders

At the scale of Flanders 17 subregion types are identified based on their characteristic existing mixed land use. Each of these subregion types can return at different places in Flanders, as schematically shown in figure 2. Each type is hereby characterised by a specific morphological multiple land use of functions and activities. But also the other multiple land use characteristics - level of pressure, spatial dynamics, alternating spatial use, mono-/multifunctionality and penetrability – result in the identification of specific subregion types.

Figure 2. Multiple land use map for Flanders.



The following subregion types were distinguished in the more open, less built part of Flanders: green valley, recreational green region, agricultural concentration, nature concentration, low-dynamic countryside, dynamic countryside, high-dynamic countryside. The difference between subregion types dominated by only one land use (agricultural concentration, nature concentration, recreational green region) and those characterised by a multiple land use but with a differentiation in dynamics (low-dynamic countryside, dynamic countryside, high-dynamic countryside) is remarkable.

Especially for the latter type of open space, the actual spatial planning policy in Flanders gives little to go on since it approaches the countryside through the dominant, structuring but nevertheless spatially divided land uses nature, forestry and agriculture.

The following subregion types were distinguished in the more urbanised parts of Flanders: coast, urban centres, urban fringes, very accessible urban fringes (in reach of the highway network), luxury green residential regions, connection roads with leisure and commercial developments, gateways and industrial regions, fine-meshed urban network, large-meshed urban network and urbanised valley. Some of the subregions such as the urban centres, urban fringes, gateways and connection roads with leisure and commercial developments are very familiar and have been extensively analysed and studied in the past. The actual spatial planning policy for Flanders already comprises development perspectives for these subregions that stress the improvement of multiple land use as a point of special interest. Other areas are less familiar and are identified, especially in relation to the research focus on multiple land use (fine-meshed urban network, large-meshed urban network, urban valley and very accessible urban fringes). Especially for these regions new planning policy perspectives need to be formulated.

The final report of the research project contains for each of the subregion types a list of the functions, activities and land uses present. It also indicates the morphological pattern of the mixed land use (fragments, lattice, concentration) and the other most significant multiple land use characteristics of the subregion. Finally, the actual dominant multiple land use type(s) – this is the existing mixed land use profile of the subregion – and the potential multiple land use type(s) are represented in diagram form. This indication of potential multiple land use type(s) suggests how the existing mixed land use in the subregion could be changed in its temporal, spatial or relational dimension through territorial policy. By way of illustration, the analysis for the ‘very accessible urban fringes’ (in reach of the highway network) is elaborated on more in depth.

The ‘very accessible urban fringes’ in Flanders are situated west of Brugge, south of Kortrijk, south of Ghent, north-east and south of Antwerp, north and south of Mechelen, at three places in the Brussels’ fringe and the south of Hasselt. All these regions are characterised by a spatial-morphological concentration of numerous functions, activities and land uses such as offices, leisure, housing, public services, ... (figure 3). The ‘very accessible urban fringes’ have developed differently from the common urban fringes because they have recently attracted specific traffic generating functions and activities that needed and took advantage of the accessibility of these locations.

Figure 3. Actual spatial-morphological pattern of functions, activities and land uses in the very accessible urban fringes.

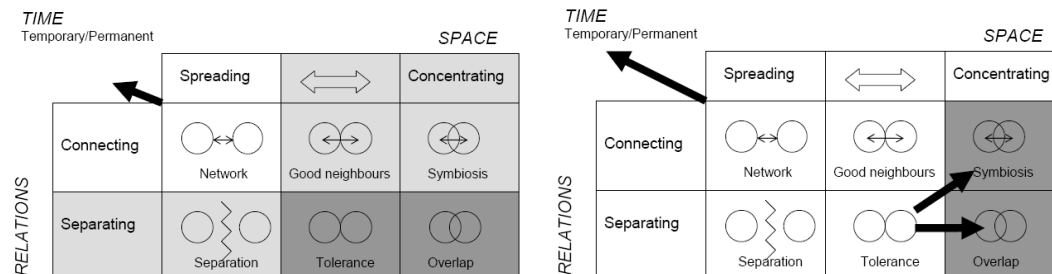
	offices			services			leisure			industries			recreation			housing			agriculture			nature		
	fragments	lattice	concentration	fragments	lattice	concentration	fragments	lattice	concentration	fragments	lattice	concentration	fragments	lattice	concentration	fragments	lattice	concentration	fragments	lattice	concentration	fragments	lattice	concentration
Highly accessible urban fringes	X	.....	.....	X	X	X	X	X	.....	.....	X	.....	.....	.....	X	.....	.....	x	.....	.....	.....

A capital ‘X’ indicates that this specific spatial-morphological pattern of a certain function, activity or land use is characteristic to all ‘very accessible urban fringes’. A minor ‘x’ indicates that the specific morphological pattern of a function, activity or land use only refers to a few ‘very accessible urban fringes’.

Functions, activities and land uses in the ‘very accessible urban fringes’ are characterised by a large morphological pixel, a periodical use (related to opening hours), inaccessibility for the people living in the surroundings or for people passing by and the limited relations with other functions and activities. Housing is also present in the ‘very accessible urban fringes’ but not that dominant as in common urban fringes. The dominant functions are ‘offices’ and ‘(public) services’. In a few ‘very accessible urban fringes’ large-scale leisure projects also determine the mix of land uses.

The actual mixed land use profile in the ‘very accessible urban fringes’ can be schematically labelled as ‘tolerance’ or ‘overlap’ (figure 4-left), characterised by a spatial separation of functions, activities and land uses. Due to their increasing attraction, an increasing number of functions and activities is located in these locations; waste lands or buffer zones are becoming rare. Sometimes functions, activities and land uses start to ‘overlap’ meaning that infrastructure (parking places, ...) is shared with neighbouring functions and activities.

Figuur 4. Actual (left) and potential (right) mixed land use profile of ‘very accessible urban fringes’.



The most evident mixed land use potential of the ‘very accessible urban fringes’ (figure 4-right) is situated in the temporal dimension since these locations are used only a few hours per day, depending on the opening hours or working hours of the diverse functions. By means of the localisation of new activities with complementary working or opening hours these places can be used more intensively.

Moreover the interactions between the diverse functions and activities can be intensified. As a consequence, the actual profile of multiple land use in the area can evolve in the relational dimension of mixed land use to ‘network’. A new activity, interrelating with existing activities, can alter the profile of mixed land use in the area into ‘symbiosis’.

It is always necessary to maximise the land use in these subregions by realising shared spaces or ‘overlap’ and to make these regions better accessible to neighbours or passers-by.

3.2. Mixing feasibilities of functions, activities and land uses

Parallel to the potential mixed land use profile for the subregions in Flanders, mixing feasibilities for a number of functions, activities and land uses were formulated. The latter were either determining functions for the Flemish spatial structure or were rather small-scaled but widespread in Flanders. Flemish government asked to develop mixing feasibilities for the following functions, activities and land uses: prisons, abandoned military domains, large-scale leisure activities (golf courts, motocross, indoor leisure activities), large-scale services (rest homes, hospitals, school campuses, power stations, large-scale shopping malls), small-scale farms, small-scale offices and small-scale (semi) industrial firms (not located on industrial parks).

First, each function, activity or land use is described in general terms. Next, this information is integrated in an analysis of the six multiple land use characteristics already mentioned above. Finally, an assessment is made which dimensions of multiple land use (time, relations, space) could especially be influenced by the function, activity or land use. By way of illustration the analysis for ‘indoor leisure activities’ is shown.

The notion ‘indoor leisure activities’ comprises the whole range of hippodromes over fitness centres to climbing walls. These activities are often highly dynamic and need quite a lot of surface. The most important multiple land use characteristics of ‘indoor leisure activities’ are shown in table 2.

Table 2. Multiple land use characteristics of ‘indoor leisure activities’.

Pixel	1 or a few ha up to a maximum of 10 ha Often one massive entity, sometimes a pattern of smaller entities
Impact	Limited nuisance due to the indoor character of the activities Nuisance contour 0-50 m
Ir-/reversibility	Pretty easily reversible: immediately (0 year) to conditionally (3-30 years), often dependent on investment costs
Constant/periodical	Periodically use during opening hours (day and night, year round)
Introvert/extravert	Introvert
In-/accessibility	Conditionally accessible (private, during opening hours, entrance fee)

‘Indoor leisure activities’ have only limited potentials for mixed land use, mainly because of their introvert character. This implies that the introduction of ‘indoor leisure activities’ in a region will especially effect the temporal and spatial dimensions of multiple land use. Only rarely, the introduction of indoor leisure activities in a region will improve the relations between functions and activities already present.

3.3. Suggestions for spatial policy

The mixed land use profile of a specific subregion indicates which dimensions of multiple land use can be influenced. The diagram shows in which direction the existing mixed land use can evolve in future, distinguishing changes in the relations between different functions and activities, changes in spatial occupation and changes in the temporal use of space. The ultimate choice of which dimensions of multiple land use in a certain region should be influenced is however a political-normative decision.

Once this decision is made, actual changes in the mix of land uses can be prepared. On the one hand, the existing mix of land uses can be optimised by influencing one or more of the three dimensions of multiple land use. On the other hand, it is also possible to assess how much a function, activity or land use to be introduced in the region can result in the desired optimisation of mixed land use. The following case will highlight how the allocation of an ‘indoor leisure activity’ in a ‘very accessible urban fringe’ can contribute to an improvement of the existing mixed land use (see also figure 5).

The introduction of an ‘indoor leisure activity’ in a ‘very accessible urban fringe’ has an important impact on the spatial and temporal dimensions of multiple land use and is of less importance to the relational dimension.

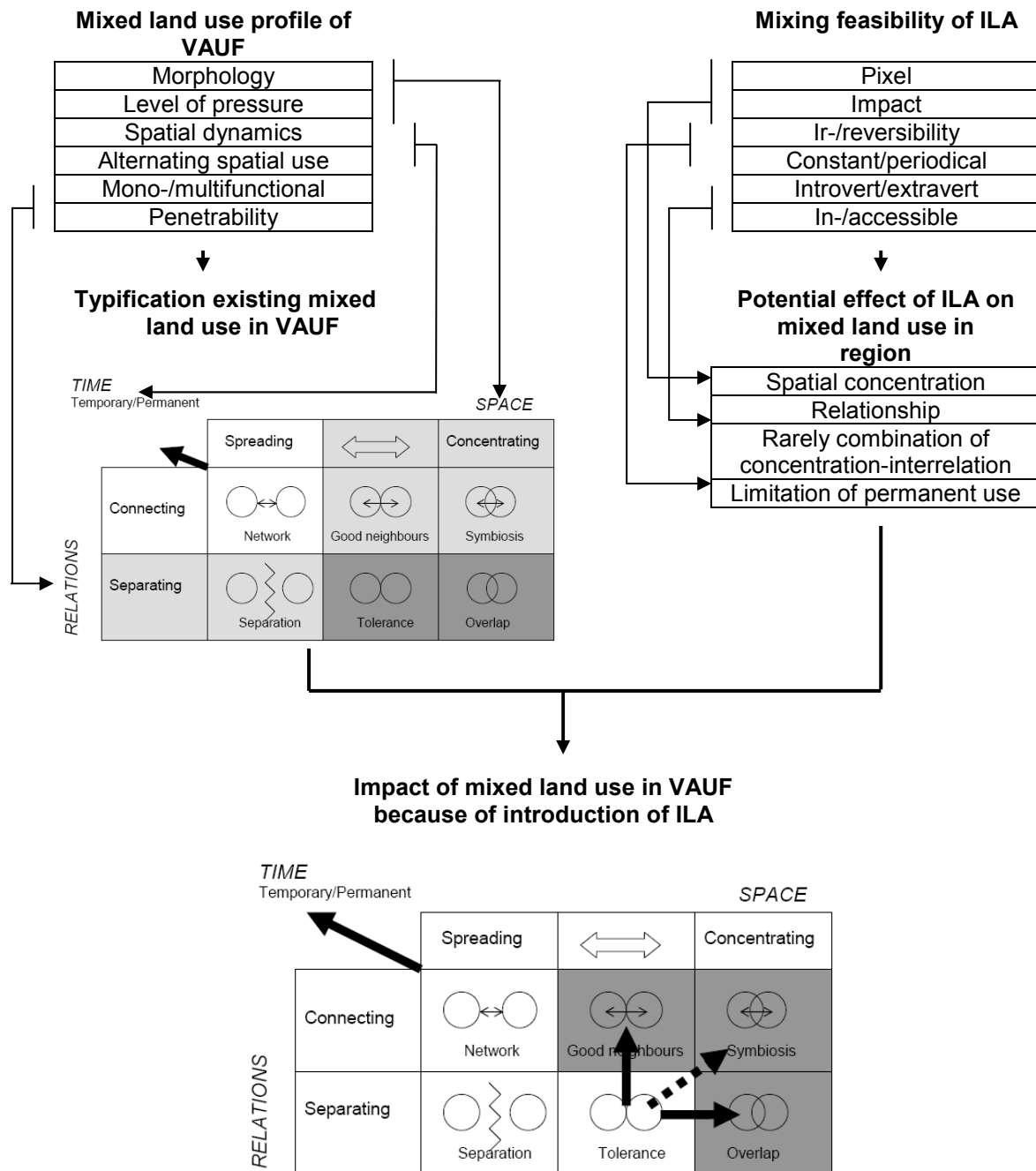
An indoor leisure activity can broaden the temporal use in the subregion since a lot of these activities take place in the weekend or the evenings, outside of the opening hours of current activities.

The realisation of new constructions for indoor leisure activities on former waste land or buffer zones will always lead to a higher density in the very accessible urban fringe. This will imply that the mixed land use can eventually shift from ‘tolerance’ to ‘overlap’.

If the indoor leisure activity, for instance a fitness centre, can in some way be related to already present large-scale functions and activities such as offices. Employees can fitness during their lunch time. The mixed land use might eventually even shift from ‘tolerance’ to ‘good neighbour’.

Only in a few cases it will be possible, by introducing an indoor leisure activity, to shift the mixed land use in ‘very accessible urban fringes’ in all of the three dimensions. The realisation of a fitness centre at a hospital campus, open at night and in the weekends to employees of the hospital and neighbouring offices and to students of the nearby university, could be such an exquisite example. In that case the mixed land use alters from ‘tolerance’ into ‘symbiosis’.

Figuur 5. Impact of the introduction of indoor leisure activities (ILA) on the mixed land use in the 'very accessible urban fringe' (VAUF).



4. Conclusion

The methodology developed in the research project has no need in distinguishing bad or good forms of mixed land use. Only potential development perspectives concerning the three dimensions of multiple land use – spatial, relational and temporal – are defined. The final choice of a development perspective is a normative decision. Furthermore, the case studies at micro scale – not elaborated on in this paper – have shown that, by adding three extra localisation characteristics to the six multiple land use characteristics, the mixed land use issue can be integrated into a broader localisation issue. To make the

methodology efficient for a satisfactory localisation exercise, also policy parameters and aspects concerning the societal and political support in a region should be added. The integration of the methodology to approach mixed land use in a broader localisation problem has the added value that the allocation of a project to a region simultaneously affects the mixed land use in this region.

The implementation at the Flemish scale and at the micro scale of the case studies has shown that the methodology is scale independent. It is in other words useful to assess how a function, activity or land use will influence the existing land use in a region and/or to evaluate which functions, activities or land uses are needed to change the mixed land use in a region to the mixed land use wished for.

Finally, the research has indicated that the results at macro scale can not be translated *linea recta* to the micro scale. An important reason is the information gap between both scales. It could perfectly happen that the existing mixed land use profile in a certain region is typified in a certain way at macro scale but that, at the same time, the typology at micro scale for a specific location within this region is different because of additional and more detailed information about the multiple land use characteristics. As a consequence, it could be possible that it doesn't seem feasible at all at macro scale to mix a specific function, activity or land use into the existing mixed land use of a certain region, but that it seems perfectly possible to do this at the micro scale. Obviously, this observation has consequences for the valorisation potential of the multiple land use map of Flanders.

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